

REMARKS

Claims 1 and 13-18 are now presented for examination. Claims 2-12 were cancelled previously. Claims 1 and 14 have been amended. Claims 1 and 14 are independent.

Claims 1 and 13-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over European Patent Application EP 0 726 591 A1 (Suzuki '591) in view of European Patent Application EP 0 729 168 (Suzuki '168) and U.S. Patent No. 4,849,674 (Cherry et al.).

The present invention involves producing an electron source comprising plural electron emission devices connected in a matrix form with row and column wirings, and is directed to preventing or at least substantially minimizing an undesired reduction in a partial pressure of a deposit material within an atmosphere during the producing. It has been noticed that if, during the producing of electron emission devices, successive voltage applying sub-steps are performed so that, in each successive sub-step, a voltage is applied to plural row wirings each of which is adjacent to a row wiring to which the voltage was applied in an immediately prior sub-step, an undesired partial pressure reduction can occur. The inventor has discovered, however, that by performing each sub-step such that the voltage is applied to selected non-adjacent row wirings that also are not adjacent to row wirings to which the voltage was applied in an immediately-prior sub-step, the undesired partial pressure reduction can be substantially avoided.

As an example of the manner in which such sub-steps are performed in accordance with this invention will now be described. In a 1st sub-step, assuming that there

are 1st-14th row wirings arranged in that order successively, non-adjacent row wirings, such as a 1st, 6th and an 11th row wiring, are selected. In a next sub-step (e.g., a 2nd sub-step), other plural row wirings (e.g. 4th, 9th and 14th row wirings) that are not adjacent to each other, and which also are not adjacent to any of the row wirings (e.g., the 1st, 6th and 11th) selected in the 1st sub-step, are selected. In a next sub-step (e.g., a 3rd sub-step), still other row wirings (e.g., 2nd, 7th and 12th row wirings) that are not adjacent to each other and non-adjacent to the row wirings (e.g., 4th, 9th and 14th row wirings) selected in the prior sub-step (e.g., the 2nd sub-step), are selected. In this manner, the sub-steps of this example are conducted successively. It should be understood, of course, that the foregoing example has been presented merely for purposes of illustration only, and is not intended to limit in the scope of any claim herein.

Claim 1 has been amended to even further clarify the manner in which the sub-steps are performed to non-adjacent row wirings. For example, as amended Claim 1 now recites, in part, that the voltage applying step comprises plural sub-steps, each of which includes selecting simultaneously certain plural row wirings including plural row wirings that are not adjacent to each other and applying a voltage to the certain plural row wirings selected simultaneously, within an atmosphere containing an organic gas. The sub-steps are conducted successively so that, in each sub-step, the row wirings to which the voltage is applied simultaneously include plural row wirings each of which is adjacent to row wirings to which the voltage was not applied in an immediately prior one of the sub-steps and is not immediately sandwiched by row wirings to which the voltage was applied in the immediately prior one of the sub-steps, wherein at least one deposit is deposited as a

result of the voltage applying step.

Independent Claim 14 also has been amended along the same lines. For example, as amended, the claim recites, in part, a depositing step of depositing the deposit, the depositing step comprising at least three sub-steps, each including applying a voltage to at least one respective row wiring to deposit the deposit to at least one pre-element connected to the at least one respective row wiring, within an atmosphere containing an ingredient for the deposit. The at least three sub-steps are conducted successively so that, in each of the at least three sub-steps, the at least one respective row wiring to which the voltage is applied is adjacent to a row wiring to which the voltage was not applied in an immediately prior one of the sub-steps and therefore is not immediately sandwiched by row wirings to which the voltage was applied in the immediately prior one of the sub-steps.

Again, by virtue of each sub-step being performed for row wirings that are not adjacent to and not sandwiched by those for which an immediately-prior sub-step has been performed, an undesired reduction in a partial pressure of a deposit material within an atmosphere is substantially avoided.

As pointed out in the Amendment filed January 29, 2004, Suzuki '591 relates to a structure for applying a voltage simultaneously to a plurality of wirings for supplying an activation material to elements, and a structure for applying a voltage successively to adjacent wirings, and also teaches that a voltage is applied within an organic substance atmosphere.

Suzuki '168, at page 13, lines 21-23 (relied on in the Office Action), states that, in a case where a plurality of columns are selected, the temperature distribution within

the substrate, which is caused by the evolution of heat at forming, is taken into consideration. According to Suzuki '168, it is preferred that the columns be selected in, say, a zigzag manner to uniformize the temperature distribution.

Cherry et al. refers to a structure for activating an electroluminescent powder phosphor by flowing a current therethrough. According to Cherry et al., a matrix display panel may be initially formed by energizing for a particular time an initial set of column or row electrodes spaced about 16 electrodes apart. Thereafter, another set of electrodes is energized to allow the previous set to cool. Spaces sets of electrodes of the panel are cycled in this fashion for about 90 minutes until the panel has been initially formed to about 25 volts (*see, e.g.*, col. 3, lines 18-26).

Applicant respectfully submits, however, that nothing in either Suzuki '591, Suzuki '168, or Cherry et al. would teach or suggest plural sub-steps, each of which includes selecting simultaneously certain plural row wirings including plural row wirings that are not adjacent to each other and applying a voltage to the certain plural row wirings selected simultaneously, within an atmosphere containing an organic gas, wherein the sub-steps are conducted successively so that, in each sub-step, the row wirings to which the voltage is applied simultaneously include plural row wirings each of which is adjacent to row wirings to which the voltage was not applied in an immediately prior one of the sub-steps and is not sandwiched by row wirings to which the voltage was applied in the immediately prior one of the sub-steps, as recited in Claim 1.

Moreover, as pointed out in the Amendment filed on January 29, 2004, Cherry et al. apparently is concerned with a need to avoid a problem of heat, and Suzuki

'168 is concerned with a problem in which heat is generated at the time of forming an electron-emitting device. Neither of these references, however, is seen to be directed to a need to avoid a reduction in the partial pressure of material within an atmosphere at the time of depositing a deposit, as is Applicant's invention. As such, there would have no reason why one skilled in the art, who was confronted with the same problem as was confronted by Applicant at the time of his invention, would have even consulted those references, let alone been motivated to combine them in a combination as proposed in the Office Action.¹

For all of these reasons, it is respectfully submitted that it would not have been obvious to combine Suzuki '591, Suzuki '168, and Cherry et al., in the manner proposed in the Office Action, in an attempt to attain the method of Claim 1. Claim 1 is deemed clearly patentable over those references, whether considered separately or in combination.

Also, for substantially the same reasons as those set forth above, it is respectfully submitted that nothing in the prior art references relied on in the Office Action would teach or suggest a method as set forth in Claim 14, in which plural sub-steps are conducted successively so that, in each of at least three sub-steps, the at least one respective row wiring to which the voltage is applied is adjacent to a row wiring to which the voltage was not applied in an immediately prior one of the sub-steps and therefore is

^{1/} It is noted that the Office Action does not address this argument, even though it was made substantially along the same lines in the Amendment filed January 29, 2004. The Examiner is respectfully requested to consider and formally address the argument in response to the present Amendment.

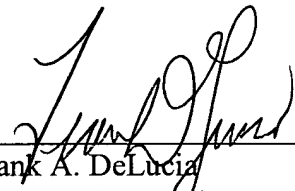
not immediately sandwiched by row wirings to which the voltage was applied in the immediately prior one of the sub-steps. Claim 14 is therefore believed to be patentable over those references, whether considered separately or in combination.

Claim 13 depends from Claim 1, and Claims 15-18 depend from Claim 13, and also are believed to be patentable over the prior art relied on in the Office Action, at least for the reason that each dependent claim depends from a patentable base claim.

In view of the foregoing remarks, Applicant respectfully requests favorable reconsideration and early passage to issue of the present application.

Applicant's undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



Frank A. DeLucia
Attorney for Applicant
Registration No. 42,476

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200

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